

Crompton Corporation Witco Facility Petrolia, Pennsylvania

Presented to:
PADEP and USEPA
January 4, 2001

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Discussion Topics

- Facility Layout and Operations
- Preliminary Remedial Investigation *1999 report*
- Potential Areas of Concern (AOCs)
- AOC Closure Objectives
- Closure Strategy
- Remedial Investigation

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* don't know pre 1860's -
used as a petroleum exploitation
area
(oil wells)

Facility Layout and Operations

- ▶ Historical plant operations
- ▶ Current plant operations
- ▶ Environmental setting → strip + deep mining on property.
- ▶ Active waste management areas

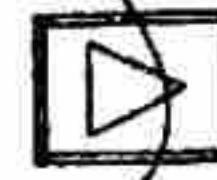
Witco owned since 1860's
to 1999 now
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originally had
acid cracking process
until 1985
replaced with
hydro treatment
process
hydrogenation
process

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ESC

some used
in process

- neutral oils
- barium salts
- sodium sulfonates
- methanol



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current waste
goes to onsite
landfill.



Dapped
resid. waste
landfill
leachate
treated onsite
→ barinate
filter cake
storage area
laboratory
waste
storage area

Preliminary Remedial Investigation

Scope of Work:

- Evaluate and document historical waste handling and disposal activities
- Conduct preliminary hydrogeologic evaluation of facility
- Verify the presence or absence of constituents of interest in groundwater

} not a lot of sampling for COI's at site wells to date.

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Preliminary Remedial Investigation

Scope of Work:

- Identify potential AOCs
- Evaluate potential to close under Act 2
- Assess whether historical facility operations pose an imminent threat

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Preliminary Remedial Investigation

Findings:

- ▶ 18 potential AOCs identified, plus two former operational areas
- ▶ Surface water runoff control and treatment
- ▶ Summary of the facility geology and hydrogeology → perched gw, unconsol. aquifer,
- ▶ Groundwater quality results → everything ND except for
- ▶ Sludge sample results from AOC 17 → Ba in sludge (348) + found not leachable
- ▶ No imminent threat to human health and environment

not including AOC 17A

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adequate system in place to treat runoff.

Benzene in sludge (348) + found not leachable

Since closed under residual waste program.

Areas of Interest

Former Waste Disposal and Handling Areas:

- ▶ 7 impoundments or lagoons (AOCs 1 - 3, 8, 11, 12, 15)
- ▶ 8 landfills or waste disposal areas (AOCs 4, 5, 9, 13, 14, 16 - 18)
- ▶ 1 Spray Irrigation Field (AOC 10)
- ▶ 1 Inert Material Storage Area (AOC 6)
- ▶ 1 Fire Training Pit (AOC 7)
- ▶ Former Acid Plant (Area 5) → no longer exists
- ▶ Former Acidified Oil Storage Area (Area 15) → no longer exists

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Status of Potential AOCs

► AOCs 1 - 8:

- Closed with PA Solid Waste Management program oversight

received final closure from the state + EPA concurred.

► AOCs 9 - 16 and 18:

- Closed as unregulated AOCs (received waste before Sept, 7, 1980)

Areas.

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Status of Potential AOCs

► AOC 17:

- Closed as regulated AOC (received waste after Sept. 7, 1980), closure completed during 2000
- Grading of existing material
- Construction of pressure release zone
- Excavation of anchor trench/perimeter drain
- Placement of GCL, drainage net, 24-inch protective layer
- Seeding and mulching
- Received conditional approval from PADEP

quarterly pending 2 yrs gw monitoring

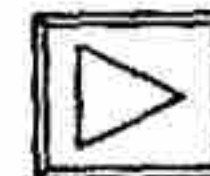
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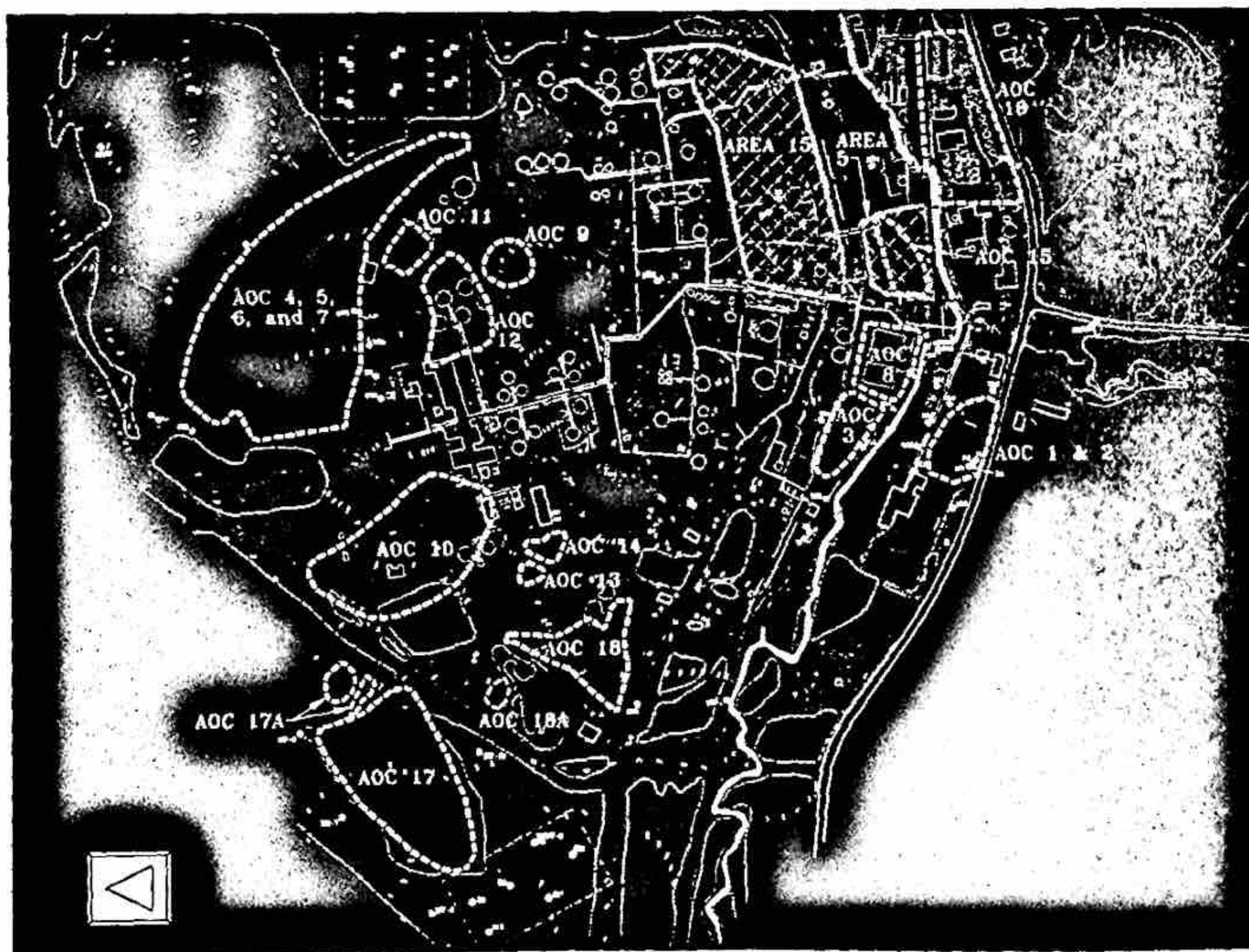
AOC Closure Objectives

- Conduct RI at AOCs 8 - 16, 18 and former operations areas (Areas 5 and 15) ⓘ
- Complete necessary Act 2 remediation and closure activities
- Receive Act 2 release from liability as appropriate
- Receive USEPA concurrence with remediation process

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Closure Strategy

- ✓ Evaluate Facility and determine location of potential AOCs
- ✓ Establish regulatory status of AOCs and determine approach to attain Act 2 release from liability
- ✓ Submit Act 2 NIR
- ✓ Closure of AOC 17
- ✓ Develop RI Scope of Work

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Closure Strategy

- ✓ Conduct Soil RI activities
- Conduct Groundwater RI activities - in progress
- Conduct remedial activities as appropriate
- Consider deed notices or restrictions for AOCs → *for IND RBC or whole facility.*
- Demonstrate attainment of Act 2 Standard(s)

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Closure Strategy

- Submit Act 2 final report(s) for PADEP and USEPA review and approval
- Receive Act 2 release from liability for AOCs from PADEP

maybe
RI
→ R Assess

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Remedial Investigation

Scope of Work:

- Evaluate baseline conditions
- Characterization and delineation activities
- Exposure pathway analysis
- Risk assessment, as necessary
- Remedial Investigation and Risk Assessment report preparation

still need to work on
↑
studied!
gw direction, & former mining activities
if find pathway
THEN do risk assessment

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Soil Characterization Activities

- Source material characterized at AOCs with waste material in place
- Soil samples collected to delineate horizontal and vertical extent of target constituents
- Waste and soil samples analyzed using SPLP → when exceeded Act 2 standards? does this work for us?
- Background soil samples collected and analyzed for arsenic

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Soil Characterization Findings

- Data screened against:
 - Act 2 Statewide Health Standards - Medium-Specific Concentrations (MSCs) for evaluation of the soil to groundwater pathway, non-residential exposures
 - Region 3 Risk-Based Concentrations (RBCs), industrial exposures

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Soil Characterization Findings

General:

- No constituents detected above Act 2 MSCs in AOCs 8, 10, 12, 17, 18, 18A
- Arsenic consistently was detected above the RBC, but not above the Act 2 MSC
- ✱ ▸ Detection limits (DLs) for several analytes exceeded Act 2 MSCs ✱

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Soil Characterization Findings

AOC 9:

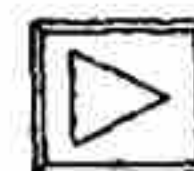
- Benzene > Act 2 MSC at 4 to 6 feet; deeper sample < DL

free liquids removed + soil stabilized with cement below

AOC 11:

- Benzene and n-propylbenzene > Act 2 MSCs at 8 to 10 feet; SPLP results < DL

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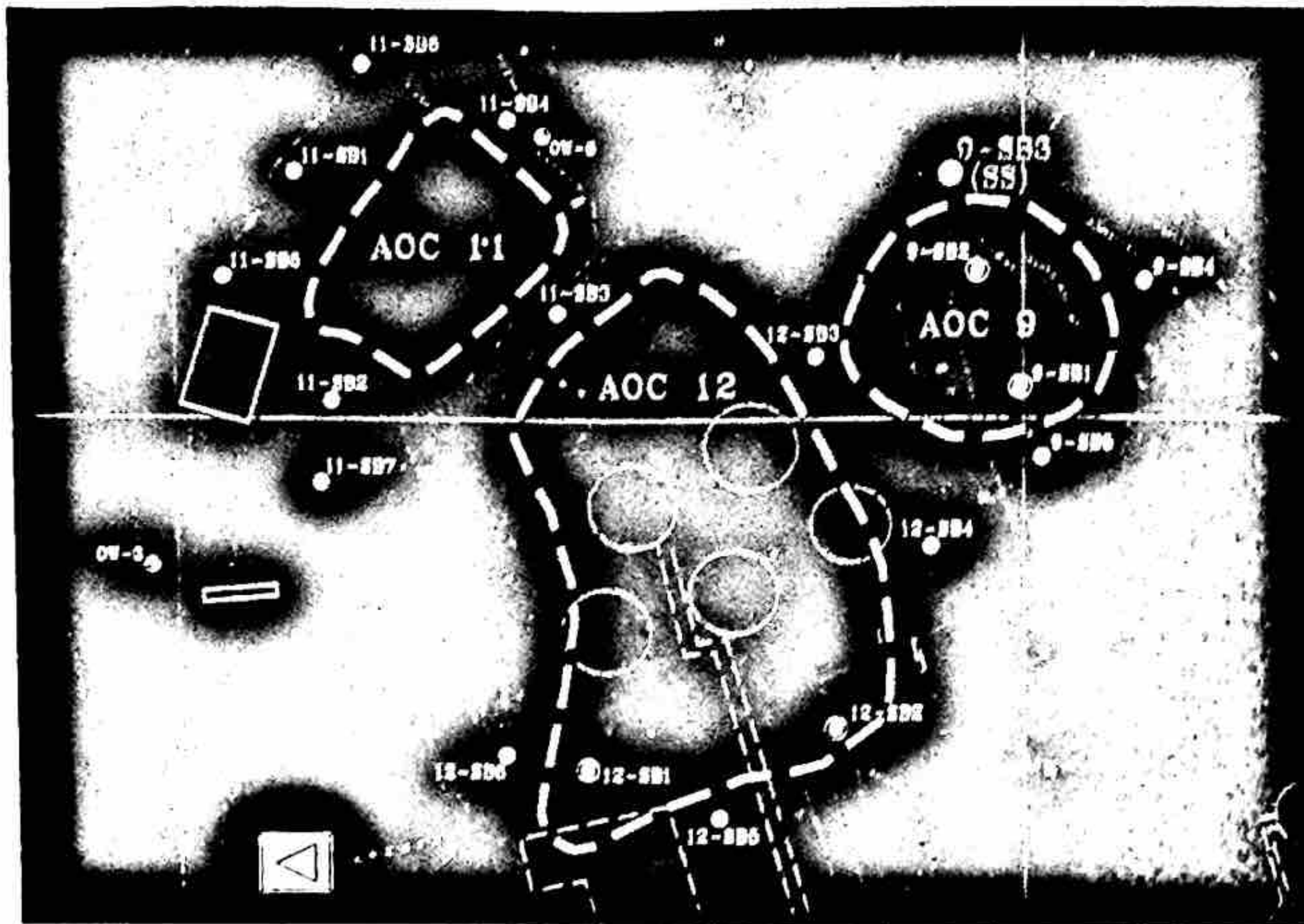


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closed prior to 1979 area is 100' Ø → heterogeneous mix of samples from each boring.

*landfill/lagoon
landfill for alum sludge*

NO SPLP done here



Soil Characterization Findings

AOC 13:

- ▶ Carbon tetrachloride > Act 2 MSC at 19 to 20 feet, no corresponding SPLP results

AOC 14:

- ▶ Carbon tetrachloride > Act 2 MSC at 10 to 12 feet, no corresponding SPLP results

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*each 50' x 50'
both below a lot
of fill
material*

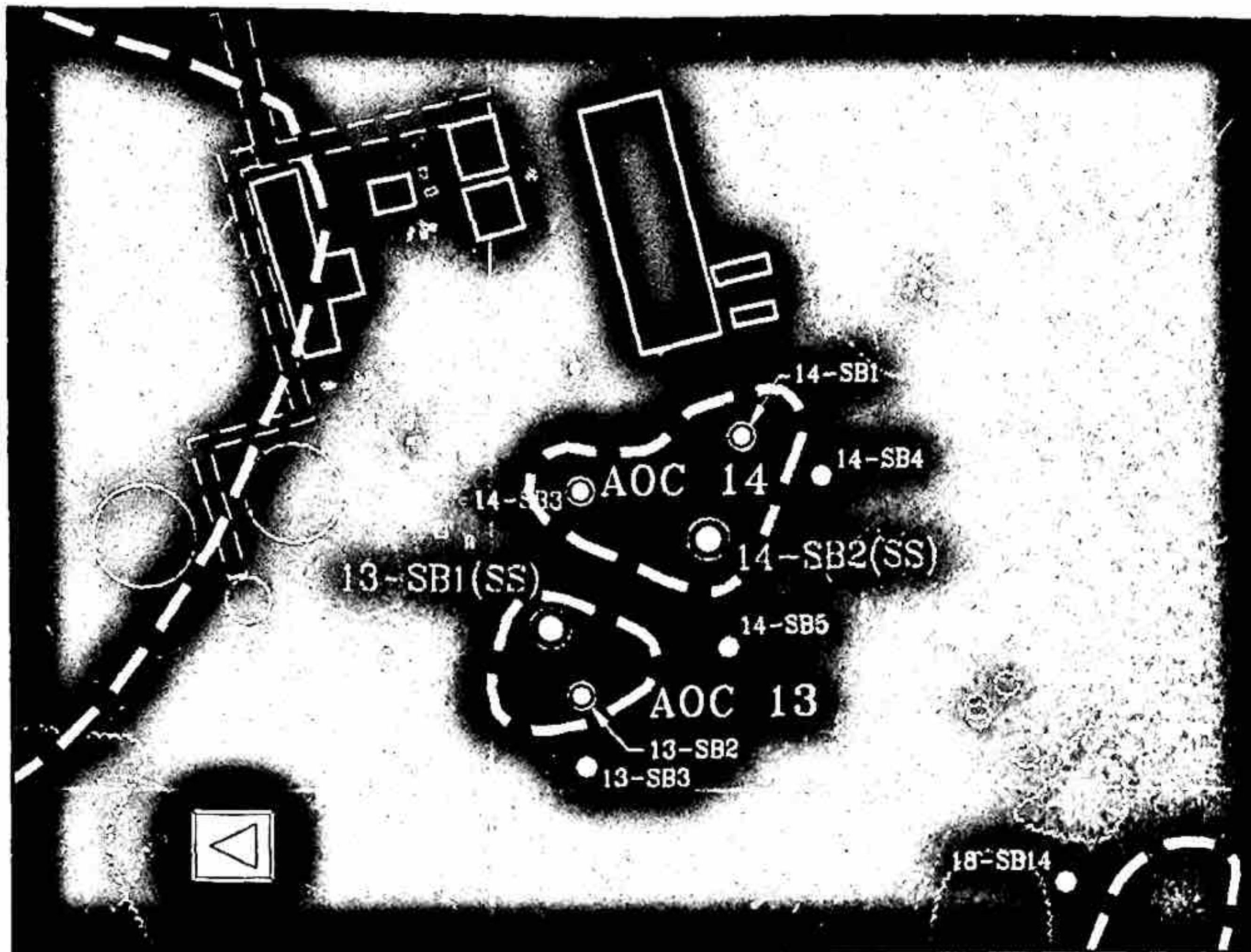
found in "source" characterization material

found in the "source" characteri

1900 ppb.

Act 2 = 500 ppb.

** no idea of where CCl₄ contamination originated from.*



impoundment lagoon.

Soil Characterization Findings

AOC 15: *within Area 5* ①

- Benzene in surface soil > Act 2 MSC; SPLP result < DL
- PCE in surface soil > Act 2 MSC; deeper samples < DL
- Benzene, PCE, and thallium at 2 to 4 feet > Act 2 MSC; sample at 6 to 8 feet < DLs
- ✱ ▸ Lead at 2 to 4 feet > Act 2 MSC; SPLP result > Act 2 MSC

potential Pb gw contamination

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Soil Characterization Findings

AOC 16:

- Nickel at 6 to 8 feet > Act 2 MSC; no corresponding SPLP result

Area 15:



- Lead and mercury, deeper samples < DL, no corresponding SPLP result

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AOC 3 Investigation

- ▶ Shallow aquifer groundwater - benzene detected > Act 2 MSCs
- ▶ Bear Creek surface water - no constituents > DLs

- believe is leaching from AOC 3.
- don't know if gw goes to stream

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Summary of Issues

Soil:

- ▶ AOCs 9, 15, and 16, and Area 15 - sample results > Act 2 MSC with no corresponding SPLP results
- ▶ AOCs 13 and 14 - carbon tetrachloride > Act 2 MSC with no corresponding SPLP results
- ▶ AOC 15 - lead in soil and SPLP results > Act 2 MSCs
- ▶ Detection limits exceed Act 2 MSCs

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*propose add'l
sampling to
verify
no
leakage*

Summary of Issues

Groundwater:

- ▶ Benzene detected in groundwater at AOC 3; lead SPLP result > Act 2 MSC at AOC 15
- ▶ Evaluation of groundwater site-wide

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Path Forward

Soil:

- ▶ AOCs 9, 13, 14, 15, and 16, and Area 15 - collect one sample from each area at similar depths for relevant SPLP analysis

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Path Forward

Soil:

- * ▶ Where detection limits exceed Act 2 MSCs

- Review existing SPLP data and have lab report method detection limits

- Where there is no SPLP data, collect one representative soil sample for SPLP analysis with low detection limits (< Act 2 MSCs)

→ in discussion w/ the lab.

- because of # of comp. in petroleum → there are so many can't read peaks.

* we know are "aliphatic hydrocarbons"

→ ³⁴ believe they know what is masking the lower detection limits

go back re-sample & verify

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Path Forward

Soil:

- ▶ No additional delineation where samples exceed RBCs, but not Act 2 MSCs
- ▶ Conduct Risk Assessment or remediation activities at areas where Act 2 MSCs are exceeded

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Path Forward

Groundwater:

- ▶ Conduct limited groundwater investigations at AOCs 3 and 15
 - AOC 3 - expanded sampling of existing wells; sediment sampling in creek
 - AOC 15 - installation and sampling of shallow monitoring wells
- ▶ Conduct groundwater monitoring at property boundary consistent with Act 2 requirements

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ENVIRONMENTAL STRATEGIES CORPORATION
PITTSBURGH OFFICE
FACSIMILE TRANSMISSION COVER SHEET
TELEFAX NUMBER: 412-787-8065

NUMBER OF PAGES (INCLUDING COVER SHEET): 6

TO: Name Ms. Hillary Livingston Fax Number 215-814-3113

FROM: Jeff Hassen

RE:

COMMENTS:

DATE AND
TIME SENT: 5/16/00

If all the pages in the telefax transmission are not received, call ESC as soon as possible at 412-787-5100 and ask for _____.

CONFIDENTIALITY NOTICE

The information in this facsimile is intended for the named recipient only. It may contain confidential information. If you have received this facsimile in error, please notify us immediately and destroy the facsimile. Do not disclose the contents to anyone. Thank you.



FAX TRANSMISSION

To: MONICA JONES

Date: 05/16/00

Fax #: 410-305-3095

Pages: 6 total.

From: HILARY LIVINGSTON

Subject: WITCO'S LATEST & GREATEST!! ☺

COMMENTS:

Monica -

This is a summary of all
of their comments to date.

Thanks

Hilary

**ENVIRONMENTAL STRATEGIES CORPORATION**

Four Penn Center West • Suite 315 • Pittsburgh, Pennsylvania 15276 • (412) 787-5100 • Fax (412) 787-8065

May 16, 2000

Ms. Hillary Livingston
RCRA Pennsylvania Operations Branch (3WC22)
United States Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Response to Comments on the Remedial Investigation Data Quality Objectives
CK Witco Corporation, Petrolia, Pennsylvania

Dear Ms. Livingston:

This correspondence provides a response to the United States Environmental Protection Agency's (USEPA's) comments on the Remedial Investigation Data Quality Objectives provided in your facsimile transmissions, dated May 5, 2000, May 12, 2000, and conference call on May 9, 2000. The remedial investigation quality assurance procedure modifications are described in this letter.

USEPA QA/QC Comments and ESC Responses:

USEPA Comment No. 1

If a compound will be evaluated using the USEPA RBC criteria, a method with a practical quantitation limit that is greater than or equal to the compound's RBC should be selected. Rather than report concentrations of vinyl chloride, chloromethane and 1,2-dibromo-3-chloropropane to the method detection limit, it is recommended that the low concentration soil method be used to analyze samples for these compounds.

Response to USEPA Comment No. 1

Soil samples collected for volatile organic compounds (VOCs) analysis in Pennsylvania under Act 2, must be collected using EPA Method 5035B, which provides the option of field preservation or utilization of EnCore® samplers, ESC determined that the low-level method of sample extraction was not an option due to laboratory-observed sample effervescence in the extraction fluid during previous facility sample analysis activities. In addition, the vinyl chloride, chloromethane, and 1,2-dibromo-3-chloropropane are not compounds of concern at

this facility. ESC believes the best sample preparation approach is to use the methanol extraction procedure..

In accordance with USEPA's May 11, 2000, facsimile, ESC will report to the practical quantitation limit (PQL). Further, ESC will instruct the laboratory to qualify any detected compound with a concentration greater than the method detection limit (MDL) and less than the PQL as "J". The "J" qualifier indicates that the reported concentration is an estimated value.

USEPA Comment No. 2

Please be advised. If N-nitrosodi-n-propylamine, benzo(a)pyrene, and dibenzo(a,h)anthracene are compounds of concern at the site, the proposed practical quantitation limits for the proposed method will not achieve the Region III RBC criteria.

Response to USEPA Comment No. 2

Neither N-nitrosodi-n-propylamine, benzo(a)pyrene, nor dibenzo(a,h)anthracene are compounds of concern at the facility. In accordance with USEPA's May 11, 2000, facsimile, ESC will report to the PQL and report "J" values for concentrations detected between the MDL and PQL.

USEPA Comment No. 3

Current SW-846 method numbers for the analysis of VOCs, SVOCs and metals are 8260B, 8270C, 6010B and 7471A, respectively. The current extraction method numbers for VOCs is 5030B and for SVOCs is 3520C. The current digestion method number for metals to be analyzed by graphite furnace atomic absorption spectroscopy is 3020A.

Response to USEPA Comment No. 3

ESC has revised Table 3-1 (enclosed) of the workplan to reflect current methodologies with the following exceptions to remain consistent with the Pennsylvania Act 2 requirements: ESC will use extraction method 5035B for VOCs in soil and EPA Method 3050B will be used as the digestion method for Act 2 metals in soil and EPA Method 3010B will be used as the digestion method for Act 2 metals in groundwater. In addition, samples collected in EnCore® samplers will be preserved in methanol within 48 hours of collection. The laboratory will analyze these extracts within 14 days of preservation, which is consistent with the SW-846 Method requirements.

USEPA Comment No. 4

The proposed digestion method for metals is appropriate for the digestion of samples to be analyzed by graphite furnace atomic absorption spectroscopy. An appropriate method for the digestion of samples to be analyzed by ICP should also be included in Table 3-1.

Response to USEPA Comment No. 4

ESC has revised Table 3-1 (enclosed) of the workplan to reflect the appropriate method for digestion of samples to be analyzed for metals by ICP. EPA Method 3050B will be used as the digestion method for Act 2 metals in soil and EPA Method 3010B will be used as the digestion method for metals in groundwater.

USEPA Comment No. 5

The SW-846 method numbers for pH is 9040B and for conductivity is 9050C. The EPA method number for temperature is 170.1. These method numbers should be included in Table 3-1.

Response to USEPA Comment No. 5

ESC has revised Table 3-1 (enclosed) to reflect these method numbers for pH, conductivity, and temperature.

USEPA Comment No. 6

For several comments Witco states that the "RI sampling and analysis procedures will be modified to address the quality control issues raised by EPA. Prior to approval of these responses, it is recommended that the modified sampling and analysis procedures be submitted to EPA for approval.

Response to USEPA Comment No. 6

The procedures referred to by USEPA including sample method requirements, quality control requirements, and instrument calibration have been modified as requested by the USEPA Quality Assurance Team in its November 17, 1999, correspondence to you regarding the Remedial Investigation Work Plan.

USEPA Comment No. 7

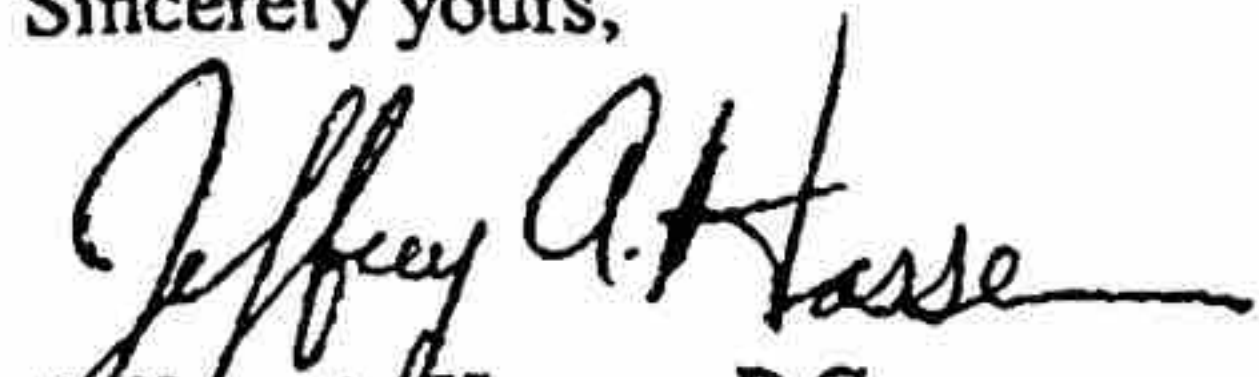
Also, prior to sampling and analysis at this site, the contractor must submit a laboratory qualifications package for the proposed laboratory.

Response to USEPA Comment No. 7

ESC submitted the laboratory Statement Qualifications and Quality Assurance Project Plan on CD-ROM under separate cover on May 8, 2000. Based on USEPA's facsimile, dated May 11, 2000, ESC will instruct the laboratory to provide SOPs for Closed System Purge and Trap and Extraction of VOCs by EPA Method 5035. Additionally, ESC will instruct the lab to provide a Level IV data package, extract SVOCs within 7 days of collection, and run a laboratory control sample with each preparation batch.

Thank you for reviewing the Remedial Investigation Data Quality Objectives and providing additional comments. Please feel free to contact us at (412) 787-5100 if you have questions regarding this correspondence.

Sincerely yours,



Jeffrey A. Hassen, P.G.
Project Director

JAH:DIB:lmk

Enclosure

cc/encl.: Ms. Monica Jones, USEPA Region III
Ms. Anita M. Stainbrook, PADEP Meadville Office
Mr. Al Neshaiwat, CK Witco
Mr. Mark Ansel, PADEP Meadville Office
Mr. John Simon, Environmental Strategies Corporation

docs/Witco/138093/response.doc

Table 3-1
Analytical Methods and Sample Handling Requirements (a)
Remedial Investigation
CK Wilco Facility
Petrolia, Pennsylvania

Parameter	Matrix	Method (b)	Container	Preservative	Holding Time (c)
VOCs	Soil	5035B/8260B	3 EnCore [®] samplers; 1 125-ml glass (dry weight and effervescence test)	4°C	48 hours to preserve (d); 14 days from preservation to analysis.
SVOCs	Soil	3540/8270C	1 250-ml glass	4°C	14 days to extraction; 40 days to analysis
Act 2 Metals	Soil	3050B/6010/ 7471	1 250-ml glass	4°C	Mercury 28 days; All other metals 180 days
pH	Groundwater	9040B	NA	NA	NA
Specific Conductance		9050A		NA	NA
Temperature		170.1		NA	NA
VOCs	Groundwater	5030/8260 5030B/8260B	2 40-ml VOA vials	4°C; HCl to pH<2	14 days
SVOCs	Groundwater	3520C/8270C	2 1000-ml amber glass	4°C	7 days to extraction; 40 days to analysis
Act 2 Metals (total)	Groundwater	3010B/6010/6010B 7471A	1 500-ml plastic 1 130-ml glass (mercury)	4°C; HNO ₃ to pH<2	Mercury 28 days; All other metals 180 days
Act 2 Metals (dissolved)	Groundwater	3010B/6010B/7471A	1 500-ml plastic 1 130-ml glass (mercury)	4°C (e)	Mercury 28 days; All other metals 180 days

a/ VOCs - Volatile Organic Compounds.

SVOCs - Semi-Volatile Organic Compounds.

NA - not applicable.

b/ 3000 and 5000 series sample extraction or preparation methods; 6000, 7000 and 8000 series analytical methods.

c/ Holding times from time of sample collection.

d/ Samples collected in EnCore[®] samplers will be preserved with methanol within 48 hours of sample collection.

e/ Dissolved metals collected in an unpreserved container, filtered through

0.45 µ filter into a container preserved with HNO₃ to pH<2.

5/12/00

Wilco\136049\RI\WPM\Methods.xls.xls
Sheet1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE: May 16, 2000

SUBJECT: Witco Corporation: Response to Comments on the Remedial Investigation Data Quality Objectives (FY20142)

FROM: Monica D. Jones ^{mef}
Quality Assurance Team (3ES20)

TO: Hilary Livingston, RPM
RCRA Pennsylvania Operations Branch (3WC22)

The review of the Witco Corporation: Response to Comments on the Remedial Investigation Data Quality Objectives has been completed. This Response to Comments is acceptable. After the proposed laboratory's Standard Operating Procedures for Closed System Purge and Trap and Extraction of Volatile Organic Compounds in Soil have been reviewed and approved, it is recommended this Response to Comments be approved.

If you have any questions about this review, please contact me at (410) 305-2747.



FAX TRANSMISSION

To: Jeff Hassen
Fax #: 412-787-8065
From: Hilary Livingston
Subject: WITCO QA/QC

Date: 05/12/00
Pages: 3 total

COMMENTS:

Jeff,

Attached are Monica's latest comments. It looks like you are good to go. Please contact me once you've looked things over to discuss.

Thanks,

Hilary

215-814-3449.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE:	May 11, 2000
SUBJECT:	Witco Corporation: Proposed Laboratory's Quality Assurance Plan and Method Detection Limits (FY20134)
FROM:	Monica D. Jones Quality Assurance Team (3ES20)
TO:	Hilary Livingston, RPM RCRA Pennsylvania Operations Branch (3WC22)

The review of the Witco Corporation: Proposed Laboratory's Quality Assurance Plan and Method Detection Limits has been completed. Based on the review of the laboratory's MDLs for vinyl chloride, chloromethane, 1,2-dibromo-3-chloropropane, N-nitrosodi-n-propylamine, benzo(a)pyrene and dibenzo(a,h)anthracene and a conversation with a Region III toxicologist, it is recommended that the proposed practical quantitation limits for this project be accepted. The laboratory should qualify any detected compound with a concentration greater than the method detection limit and less than the practical quantitation limit as "J". The "J" qualifier indicates that the reported concentration is an estimated value. This information will provide a toxicologist with sufficient information to perform a risk assessment.

Prior to approval of Kemron as Witco's proposed laboratory for this site, the following deficiencies should be addressed:

- The list of SOPs in the Kemron Laboratory Quality Assurance Plan (LQAP) does not include an SOP for Closed System Purge-and-Trap and Extraction of Volatile Organics in soil and waste samples. The contractor must ensure that the laboratory has the capability of analyzing samples using SW- 846 method 5035. It is further recommended that the Agency obtain a copy of the Kemron SOP for this method. (Appendix B)
- To ensure that the analytical data package contains sufficient documentation to allow the data to be validated, the contractor must request the Level IV(a) Report Format. (Section 12.4)
- The holding time for semivolatiles is 7 days to extraction and 40 days to analysis. (Table 6-2)
- It is recommended that one Laboratory Control Sample be analyzed with each preparation batch. (Section 11.4.2)

In addition, when Kemron completes the next scheduled review and revision of the Laboratory Quality Assurance Plan (LQAP), the following comments should be addressed:

- The LQAP references the EPA QAMS 005/80 guidance document. QAMS 005/80 has been superseded by EPA QA/R-5: Quality Assurance Requirements for Quality Assurance Project Plans. It is recommended that the reference to QAMS 005/80 be removed. Furthermore, Kemron should review the LQAP to ensure that it complies with the requirements of EPA QA/R-5. EPA QA/R-5 can be downloaded from the Internet at <http://www.epa.gov/quality/qs-docs/r5-interim-final.PDF>. Additionally, the Quality Standard developed by NELAC also provides information about acceptable Laboratory Quality Systems. The NELAC Quality Standard can be downloaded from <http://www.epa.gov/ttnnela1/standar5.html>.

- The LQAP references older versions of the National Functional Guidelines for Data Review. It is recommended that these references be removed. Furthermore, since the laboratory is not responsible for data validation, it is recommended that Section 12.3 be removed from the Kemron LQAP.

If you have any questions about this review, please contact me at (410) 305-2747.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE: May 11, 2000

SUBJECT: Witco Corporation: Proposed Laboratory's Quality Assurance Plan and Method Detection Limits (FY20134)

FROM: Monica D. Jones ^{moq}
Quality Assurance Team (3ES20)

TO: Hilary Livingston, RPM
RCRA Pennsylvania Operations Branch (3WC22)

The review of the Witco Corporation: Proposed Laboratory's Quality Assurance Plan and Method Detection Limits has been completed. Based on the review of the laboratory's MDLs for vinyl chloride, chloromethane, 1,2-dibromo-3-chloropropane, N-nitrosodi-n-propylamine, benzo(a)pyrene and dibenzo(a,h)anthracene and a conversation with a Region III toxicologist, it is recommended that the proposed practical quantitation limits for this project be accepted. The laboratory should qualify any detected compound with a concentration greater than the method detection limit and less than the practical quantitation limit as "J". The "J" qualifier indicates that the reported concentration is an estimated value. This information will provide a toxicologist with sufficient information to perform a risk assessment.

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- To ensure that the analytical data package contains sufficient documentation to allow the data to be validated, the contractor must request the Level IV(a) Report Format. (Section 12.4)
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ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West • Suite 315 • Pittsburgh, Pennsylvania 15276 • (412) 787-5100 • Fax (412) 787-8065

May 8, 2000

Ms. Monica D. Jones
United States Environmental Protection Agency
USEPA Region III Quality Assurance Team (3ES20)
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755

Re: Laboratory QAPP and SOQ
CK Witco Corporation Remedial Investigation
Petrolia, Pennsylvania

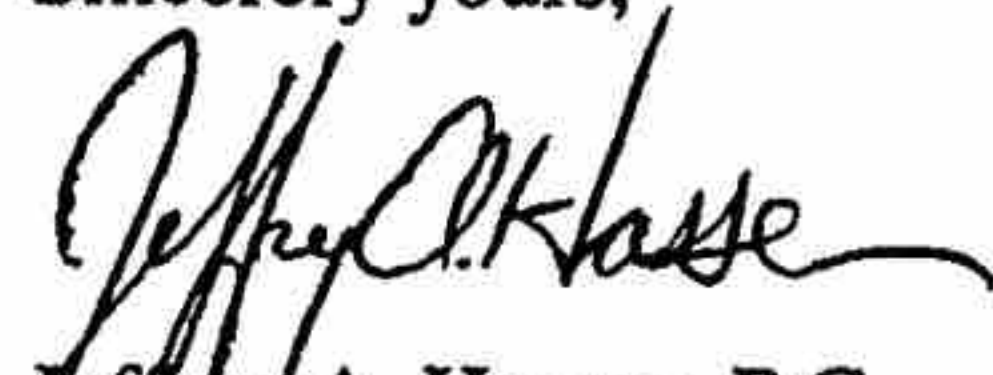
RECEIVED
PA/DG SECTION
MAY 10 2000
EPA REGION III

Dear Ms. Jones:

Per your request, please find the enclosed laboratory Quality Assurance Project Plan (QAPP) and Statement of Qualifications (SOQ) for Kemron Environmental Services (Kemron) provided on compact disk. Kemron has been selected to perform the laboratory analysis for environmental samples collected during Remedial Investigation activities at the CK Witco Corporation Petrolia, Pennsylvania facility.

Please contact me at (412) 787-5100 if you have any questions concerning the enclosed QAPP or SOQ.

Sincerely yours,



Jeffrey A. Hassen, P.G.

Project Director

JAH:ckh

Enclosure

cc: Ms. Hilary Livingston, United States Environmental Protection Agency (w/o enclosure)

Docs/witco/138093/kemronqapp.doc

conf. call
05/09/00

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
Environmental Science Center
701 Mapes Road
Fort Meade, Maryland 20755-5350

DATE: May 3, 2000
SUBJECT: Witco Corporation: Response to EPA Comments for the Remedial Investigation Work Plan (FY20107)
FROM: Monica D. Jones ^{mdj}
Quality Assurance Team (3ES20)
TO: Hilary Livingston, RPM
RCRA Pennsylvania Operations Branch (3WC22)

The review of the Witco Corporation: Response to EPA Comments for the Remedial Investigation Work Plan has been completed. Prior to approval of these responses to EPA comments, the following deficiencies should be addressed:

- 1. If a compound will be evaluated using the US EPA RBC criteria, a method with a practical quantitation limit that is greater than or equal to the compound's RBC should be selected. Rather than report concentrations of vinyl chloride, chloromethane and 1,2-dibromo-3-chloropropane to the method detection limit, it is recommended that the low concentration soil method be used to analyze samples for these compounds. (Table 2)
- 2. Please be advised. If N-nitrosodi-n-propylamine, benzo(a)pyrene and dibenzo(a,h)anthracene are contaminants of concern at this site, the proposed practical quantitation limits for the proposed method will not achieve the Region III RBC criteria. (Table 2)
- 3. Current SW-846 method numbers for the analysis of VOCs, SVOCs and metals are 8260B, 8270C, 6010B and 7471A, respectively. The current extraction method numbers for VOCs is 5030B and for SVOCs is 3520C. The current digestion method number for metals to be analyzed by graphite furnace atomic absorption spectroscopy is 3020A.
- 4. The proposed digestion method for metals is appropriate for the digestion of samples to be analyzed by graphite furnace atomic absorption spectroscopy. An appropriate method for the digestion of samples to be analyzed by ICP should also be included in Table 3-1.
- 5. The SW-846 method numbers for pH is 9040B and for conductivity is 9050A. The EPA method number for temperature is 170.1. These method numbers should be included in Table 3-1.
- 6. For several comments, Witco states that the "RI sampling and analysis procedures will be modified" to address the quality control issues raised by EPA. Prior to approval of these responses, it is recommended that the modified sampling and analysis procedures be submitted to EPA for approval.
- 7. Also, prior to sampling and analysis at this site, the contractor must submit a laboratory qualifications package for the proposed laboratory. Chemron laboratory

3010A
aqueous
3050B
dim
+ soil
sludge

table revisions + something from issue #1 + 2

If you have any questions about this review, please contact me at (410) 305-2747.

→ methods online, update 3. section 6.2.1.8
www.epa.gov/epaoswer/hazwaste/test/5035.pdf

Z 385 982 717

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Postage	\$ <i>3.45</i>
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**STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431**

MAR 8 2000

or Inspection Report for Witco Chemical Corporation

Enclosed please find a copy of the Environmental Indicator Inspection Report for the Witco Chemical Corporation for your files. This report was generated by the United States Army Corps of Engineers on behalf of the Environmental Protection Agency (EPA) after a site visit to the Witco Chemical Corporation in Petrolia, Pennsylvania on May 25, 1999. A copy of this report has also been forwarded to Ms. Sigma Toth of the Northwest Regional Office of the Pennsylvania Department of Environmental Protection (PADEP).

If you have any questions or comments regarding this report, please feel free to contact me at 215-814-3449.

Sincerely,

Paul H. H. H. H.
Mary Livingston
Project Manager
Pennsylvania Operations Branch

cc: Ms. Sigma Toth, PADEP

Customer Service Hotline: 1-800-438-2474



ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West • Suite 315 • Pittsburgh, Pennsylvania 15276 • (412) 787-5100 • Fax (412) 787-8065

October 21, 1999

Anita M. Stainbrook
Section Chief, Environmental Cleanup Program
Pennsylvania Department of Environmental Protection
230 Chestnut Street
Meadville, PA 16335-3481

RECEIVED
PA/DC SECTION

OCT 26 1999

Re: Remedial Investigation Work Plan Submittal
CK-Witco Corporation Facility
Petrolia, Pennsylvania

EPA REGION III


Dear Anita:

Environmental Strategies Corporation (ESC) is pleased to provide the Pennsylvania Department of Environmental Protection (PADEP) with two copies of the above referenced Work Plan.

The Work Plan has been prepared in accordance with the PADEP Land Recycling and Remediation Standards Act (Act 2) regulatory requirements and technical guidelines. In addition, the Work Plan addresses the United States Environmental Protection Agency's (USEPA's) goals and expectations for remediation at the Petrolia facility provided in their August 13, 1999, letter to CK-Witco Corporation.

As we discussed, CK-Witco and ESC would appreciate receipt of any comments on the Work Plan from the PADEP and USEPA within one correspondence from the PADEP. Please contact me at (412) 787-5100 if you have any questions regarding the RI Work Plan.

Sincerely,


Jeffrey A. Hassen, P.G.
Project Director

DJO:JAH:ckh

Enclosures

cc: Ms. Hilary Livingston, USEPA - Region III
Mr. Al Nesheiwat, CK-Witco Corporation
Mr. Dick Fleeger, CK-Witco
Mr. John Simon, Environmental Strategies Corporation



ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West ■ Suite 315 ■ Pittsburgh, Pennsylvania 15276 ■ (412) 787-5100 ■ Fax (412) 787-8065

July 15, 1999

Mr. Marcos A. Aquino
Environmental Protection Agency
Waste and Chemicals Management Division
3WC22
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Mr. Aquino:

As requested by Anita Stainbrook of the Pennsylvania Department of Environmental Protection, enclosed please find the following correspondence:

- Draft Closure Strategy for Areas of Concern;
- Remedial Investigation Scope of Work for Areas of Concern 17 and 18; and,
- Solid Waste Disposal History for Areas of Concern 17 and 18.

Should you have any questions or require further information, please feel free to contact me at (412) 787-5100.

Sincerely yours,

Jeffrey A. Hassen, P.G.
Project Director

JAH:ckh

Enclosures

Docs/witco/136049/aquinojulylet.doc

cc: Al Nesheiwat, Witco Corporation
John Simon, Environmental Strategies Corporation



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

AUG 13 1999

Mr. Al Nesheiwat
Witco Corporation
1 American Lane
Greenwich, Connecticut
06831-2559

RE: Witco Corporation, Petrolia
PAD 004388500

Dear Mr. Nesheiwat,

On May 25, 1999, the Environmental Protection Agency (EPA), along with the United States Corps of Engineers (USCOE) and the Pennsylvania Department of Environmental Protection (PADEP) performed a site visit to determine the status of corrective action at the Witco Corporation facility (Facility) in Petrolia, Pennsylvania. During this visit, Witco representatives expressed an interest in using the Pennsylvania Act 2 program as a vehicle in the clean up process, while still meeting federal Resource Conservation and Recovery Act (RCRA) corrective action requirements.

The short term objective of the RCRA corrective action program is to achieve environmental indicator goals at high priority sites across the nation, namely, that human exposure is controlled and groundwater releases are controlled. The long term objective of the RCRA corrective action program at these high priority sites is to select a final remedy that is protective of human health and the environment, and maintains this protection over time. The Witco remediation project has the potential to achieve both of these short term and long term objectives.

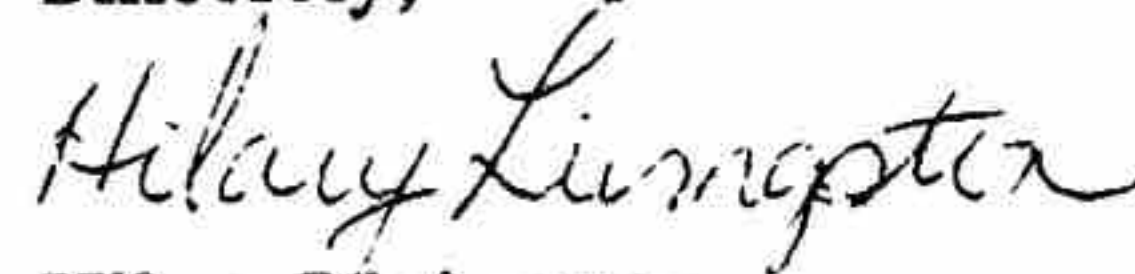
EPA received copies of the "Draft Closure Strategy for Areas of Concern" at the facility dated March 15, 1999, as well as letters concerning remedial investigation at Areas of Concern (AOC) 17 and 18, dated June 14, 1999 and June 17, 1999. In response to these submittals, PADEP provided the Facility with comments in a letter dated July 28, 1999. EPA concurs with PADEP's response to Witco's proposed strategy, however, at this time EPA would like to provide Witco with an outline of RCRA corrective action requirements as they pertain to the Witco facility (Please find attached). EPA understands that some of these requirements may differ from those of Act 2, however, EPA is confident that by working cooperatively with all parties involved, both programs can be satisfied.

Customer Service Hotline: 1-800-438-2474

A conference call involving PADEP, Witco representatives, and the EPA is scheduled for Monday, August 16. At this time EPA will be available to answer any questions that may arise in response to this letter, or to issues involving the future direction of the remediation process at the Witco facility.

If you have any immediate questions or concerns, please do not hesitate to contact me at (215) 814-3449. I look forward to working with you in the future.

Sincerely,

A handwritten signature in cursive script that reads "Hilary Livingston".

Hilary Livingston
Project Manager
Pennsylvania Operations Branch

cc: Mr. Dick Fleeger, Witco Corporation
Mr. Jeffrey A. Hassen, Environmental Strategies Corporation
Ms. Sigma Toth, PADEP
Ms. Anita Stainbrook, PADEP

**EPA's GOALS AND EXPECTATIONS FOR REMEDIATION
AT THE WITCO CORPORATION FACILITY
PETROLIA, PA**

EPA GOALS

I. Determine the extent and sources of all releases at or from the Facility using quality data.

SOIL: Identify maximum concentrations of contaminants in soil and determine the extent of any releases of contaminants to soil. Sampling should continue until concentrations in soil approach Region III's Risk-Based Concentration ("RBC") Table using the residential, or if appropriate, industrial scenario. The Risk-Based Concentration (RBC) Table can be found at the following Internet address: <http://www.epa.gov/reg3hwmd/risk/riskmenu.htm> In addition, evaluate the potential of contaminants in soil to affect other media through cross media transfer (e.g. screening against Soil Screening Levels ["SSLs"] for groundwater). Attached, please find a copy of the Soil Screening Levels.

GROUNDWATER: For aquifers qualified as Class I or Class II under EPA guidelines, determine maximum contaminant concentrations in groundwater and, to the extent practicable, the source of the groundwater contamination. EPA expects the horizontal and vertical extent of any releases to groundwater to be delineated until concentrations in groundwater approach maximum contaminant levels ("MCLs"), and Region III's Risk-Based Concentration (RBC) Table using the tap water column, where no MCLs are promulgated, independent of whether the aquifer is currently utilized as a source of potable water.

SURFACE WATER: Where contaminated groundwater potentially discharges to a surface water body, determine the maximum concentrations in surface water and sediment, and assess the extent of impact to the surface water body and sediments to levels considerative of the state designated use of the surface water body and the potential exposure to human and/or ecological receptors.

AIR: Where there is a potential for indoor or outdoor air to be contaminated by particulates or vapors through cross-media transfer, determine through appropriate methods (e.g. sampling, modeling) the maximum concentrations.

DATA QUALITY: Analytical results must accurately represent site characteristics. Appropriate EPA laboratory methods must be used in accordance to "Test Methods for Evaluating Solid Waste" (SW-846, November 1986) or other methods deemed satisfactory to EPA. Also, any laboratory used for analyses must participate in a quality assurance/quality control program equivalent to that which is followed by EPA. The current EPA "Guidance on Quality Assurance Project Plans", reference QA/G-5 (February, 1998) can be found at the following Internet address: http://es.epa.gov/ncercqa/qa/qa_docs.html

II. Evaluate and achieve the Environmental Indicators of controlling the human exposure from releases to any media and controlling the migration of any groundwater contamination at or from the Facility.

ASSESS ENVIRONMENTAL INDICATORS: EPA's initial objectives are to eliminate current human exposure to hazardous wastes and hazardous constituents and to control migration of any contaminated groundwater. To meet these objectives, EPA expects the Facility to undertake an assessment of current exposures and an evaluation of the potential contaminated groundwater migration pathways as priority activities of the site investigation.

III. Perform Interim Measures at the Facility to prevent or mitigate threats to human health and the environment.

INTERIM MEASURES: The Facility will propose Interim Measures as work progresses to address conditions presenting a threat to human health and/or the environment. Interim Measures shall also be used whenever possible to achieve the initial objectives of eliminating current human exposure to contamination and controlling contaminated groundwater migration. Interim Measure activities implemented should consider, and be consistent with, the long-term objectives for the site.

IV. Communicate regularly to EPA and the community on corrective action progress at the Facility through public participation and information sharing activities.

PUBLIC PARTICIPATION: The Facility is required to perform the following public participation activities:

- Conduct public involvement activities to inform the local community, the State and any other interested parties of activities throughout the corrective action process.
- Provide EPA with a fact sheet summarizing the status of the work to date for inclusion on EPA Region III's web page. At a minimum this fact sheet should be updated annually.

V. Final Remedies - Completing Corrective Action

FINAL REMEDIES: Eliminating human exposure to contaminants and controlling migration of contaminated groundwater are near-term objectives. Interim Measure activities implemented to achieve these near-term objectives are based on reasonably expected human exposures under current land and groundwater use conditions only. The RCRA Corrective Action Program's overall mission is to protect human health and the environment. To achieve this goal, final remedies must be based on potential future land and groundwater uses and ecological receptors.

- EPA expects to return usable groundwaters to their maximum beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of the site. When restoration of groundwater is not practicable, EPA expects to prevent or minimize further migration of the plume, prevent exposure to the contaminated groundwater and evaluate further risk reduction. EPA also expects to control or eliminate surface and subsurface sources of groundwater contamination.
- EPA expects to remediate contaminated soils as necessary to prevent or limit direct exposure of human and environmental receptors and prevent the transfer of unacceptable concentrations of contaminants (e.g., via leaching, runoff or air borne emissions) from soils, including subsurface soils, to other media.



ENVIRONMENTAL STRATEGIES CORPORATION

Four Penn Center West • Suite 315 • Pittsburgh, Pennsylvania 15276 • (412) 787-5100 • Fax (412) 787-8065

**REMEDIAL INVESTIGATION
DATA QUALITY OBJECTIVES
FOR CK WITCO CORPORATION
PETROLIA, PENNSYLVANIA**

PREPARED

BY

ENVIRONMENTAL STRATEGIES CORPORATION

MARCH 27, 2000

CK Witco\136049\PQO\Data Quality Objectives.doc

Reston, VA • San Jose, CA • Boxborough, MA • Minneapolis, MN • Houston, TX • Cazenovia, NY • Burbank, CA • Durham, NC • Tulsa, OK • Somerset, NJ

This do

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Table 1 - Laboratory Precision and Accuracy for Constituents of Interest

Table 2 - Practical Quantitation Limits for Constituents of Interest

List of Appendices:

Appendix A - Laboratory Quality Assurance Project Plan (provided on CD)

This document presents the Data Quality Objectives (DQOs) for the Remedial Investigation (RI) at the CK Witco Corporation (CK Witco) facility located in Petrolia, Pennsylvania. In addition, a copy of the proposed laboratory Quality Assurance Project Plan (QAPP) is provided on CD-ROM in Appendix A. The RI is being implemented in accordance with the Pennsylvania Land Recycling and Environmental Remediation Standards Act (Act 2) RI requirements and the United States Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act (RCRA) Corrective Action Goals and Expectations as provided in the USEPA letter dated August 13, 1999.

1.0 Project Management

The project organizational structure for implementing the Remedial Investigation Work Plan (Work Plan) is provided in this section and shown on Figure 1. ESC is the principle consultant to CK Witco for this project and will be responsible for implementing the Work Plan, including field operations, oversight of laboratory testing, data management, and reporting. The names of key project personnel responsible for project management, the collection of valid measurement data, and assessment of measurement systems for precision and accuracy are listed below.

- **John A. Simon - Senior Advisor.** ESC anticipates that complex administrative and technical issues will arise during the investigation at the CK Witco facility. ESC has identified Mr. Simon to assist in the resolution of these issues. Mr. Simon can draw on over 15 years of directly related environmental experience to guide the site investigation to a successful conclusion.
- **Jeffrey Hassen, P.G. - Project Director.** All activities performed as part of the RI will be under the overall direction of the project director. The project director's responsibilities include, but are not limited to, overall project coordination and implementation, overall project Quality Assurance/Quality Control (QA/QC), and final review of all project reports.

- **Doug Oberdorf - Field Team Leader.** The field team leader's responsibilities include the coordination of field operations, laboratory analysis, and data processing activities. In addition, the field team leader will be responsible for all subcontractor coordination. The field team leader will report to the ESC project director and will coordinate laboratory services with the ESC Quality Assurance Officer (QAO).
- **David I. Blaushild - Quality Assurance Officer.** The QAO will be responsible for meeting QA goals during the RI. He will provide general project QA/QC for all sample collection and analyses. The QAO will work closely with the laboratory project manager to ensure that all QA/QC requirements for the RI are being met.

The QAO's overall responsibilities include, but are not limited to, the following:

- field operations QC
- sampling operations and QC
- laboratory QC
- data processing QC
- data quality review
- performance and system auditing (field and laboratory)
- overall QA
- preparation and review of all analytical service requests

Kemron Environmental Services (Kemron) of Marietta, Ohio, will analyze the groundwater, soil, and, if necessary, surface water and sediment samples collected during the RI. Kemron's project manager will report to the ESC QAO to plan the analytical activities. The laboratory project manager will serve as the representative for day-to-day contacts with ESC.

2.0 Quality Objectives and Criteria for Measurement Data

The criteria that will be used to specify data quality objectives (DQOs) and to evaluate available sampling, analytical, and QA/QC options during the RI are discussed below. A summary of the QA objectives for precision and accuracy for each parameter is provided in Table 1.

Accuracy

Accuracy is defined as the degree to which the analytical measurement reflects the true level present. Accuracy will be measured as percent recovery for matrix and/or surrogate spikes.

$$\text{Percent Recovery} = \frac{X - B}{T} \times 100$$

Where:

X = measured concentration in sample after spiking

B = background concentration in the sample

T = concentration of spike added

Precision

Field and laboratory precision will be expressed as relative percent difference (RPD). QA/QC samples that test precision include comparison of field duplicates to primary samples and MS/MSD samples. The estimate of precision of duplicate measurements will be expressed as an RPD, which is calculated as follows:

$$\text{RPD} = \frac{(D1 - D2)}{(D1 + D2)/2} \times 100$$

Where:

D1 = first sample value

D2 = second sample value (duplicate)

The RPDs will be routinely calculated and compared with DQOs, as applicable.

Completeness

Completeness is a qualitative measure of the amount of valid data obtained from a measurement program compared to the amount expected under optimal conditions. Consequently, an evaluation of data completeness includes both evaluating the percentage of field samples collected versus the number of field samples proposed in the project plans, and evaluating the

success of the laboratory analyses. It is expected that the laboratory will provide data meeting QC acceptance criteria for 90 percent or more for all samples tested.

Completeness will be evaluated by carefully comparing project objectives with the proposed data acquisition scheme and the resulting potential data gaps in the required information. Completeness will be assessed for each parameter in the following manner:

$$C = \frac{V}{D} \times 100$$

Where:

C = the percentage of valid data for each parameter (includes both field and laboratory completeness)

V = the number of valid results for each parameter

D = the number of samples to be collected for each parameter according to the FSP

Representativeness

Representativeness is the degree to which the data accurately and precisely represent the characteristics of the environmental media being investigated. Therefore, representativeness must be evaluated based on two separate criteria. First, the collected samples must be adequately characteristic the media being investigated. Second, the analytical results must be adequate to characterize the COIs within the media being investigated. The sample collection procedures specified in this document are designed to ensure that the data collected are representative.

Comparability

Comparability expresses the confidence with which one data set can be compared to another. The procedures used to obtain the planned analytical data, as provided herein, are expected to provide comparable data. The following measures will be taken to ensure the comparability of the data:

- Standardized written sampling and analytical procedures will be followed.
- Standard handling and shipping procedures will be used for all samples collected.
- Results for depths, distances, elevations, concentrations, and other measurements will be reported using consistent units.

The field and laboratory data will also be reviewed to ensure that all samples within a data set or population are of comparable matrices and were collected by the specified methods.

The specific goals for completeness, accuracy, and precision are established for the results of chemical analyses as specified in the individual methods in SW-846. The goal for completeness is a minimum of 90% of the intended number of primary samples in the investigation. The goal for QA/QC samples is 100% of those specified in the methods. In general, these goals are consistent with the QA/QC goals of each particular analytical method. If precision and accuracy are not specified for an analytical method, laboratory-defined criteria will be adopted.

Practical Quantitation Limits (PQLs) consistent with those reported in SW-846 will be used as the minimum reporting levels as long as these limits are below the RBC residential screening criteria and the applicable Act 2 non-residential soil remediation standards. PQLs for the parameters to be analyzed are presented on Table 2.

As the assessment of data is conducted, the project goals may be revised to address site-specific or media-specific concerns, e.g., in cases of complex sample media or heterogeneity prevents attainment of the original project QA/QC goals.

3.0 Data Management

Data Reduction

Samples will be collected by ESC personnel and sent to the laboratory with the proper chain-of-custody documents. The laboratory will send reports of the analytical data to ESC. ESC and the laboratory will attempt to minimize manual data entry by the use of secured electronic file transfer via e-mail, on diskette, or CD-ROM. Personal computers and software packages will be used to efficiently transfer and store analytical data. ESC will review all data supplied by the laboratory and perform data validation as necessary. Laboratory data will be checked for errors in mathematical computation to ensure that the analytical values for blank contaminants

are not subtracted from results of the samples. Field blank contamination will be handled according to EPA National and Region III data validation guidelines.

All data produced during the project investigations will be organized as tables of analytical results and will be stored in a computerized database at ESC. Hard copies of all analytical data on the project will be stored in ESC's filing system. It is anticipated that ESC's data reduction for this investigation will consist primarily of tabulating analytical results from the laboratory's report forms into summary forms through the use of computerized spreadsheet software. All computerized spreadsheet files will be assigned document control numbers.

Data Reporting

Analytical data will be summarized in a tabular format with information elements to include sampling date, sample number, sample matrix description, parameters analyzed and their corresponding detected concentrations, data "flags" where appropriate, and the detection limit.

Results from the RI will be incorporated into reports as data tables, maps showing sampling locations and contamination, and supporting text. ESC will use a rigorous data control program that will ensure that all documents for the investigation are accounted for when they are completed. Accountable documents include items such as logbooks, field data records, data packages, photographs, computer disks, CD-ROMs, and reports. The ESC project manager or his designate is responsible for maintaining a central file in which all accountable documents will be inventoried.

To maintain control in the transfer of data, all copies of raw data from field notebooks and the data received from the laboratory will be entered into a data file and assigned an appropriate document control identification number. The data file will serve as the ultimate archive for all information and data generated during this investigation.

The documentation of sample collection will include the use of field logbooks and field data sheets in which all information on sample collection will be entered in indelible ink. Appropriate weather condition, sample identification, brief description of sample, date and time collection, sampling methodology, field measurements and observations; sampler's initials (bottom of each page), and name of all sampling personnel will be entered into the logbooks. All groundwater sampling activities will be recorded and will include well identification, depth of well as measured, measuring point elevation, depth-to-water, purge volume, recharge rate,

sampling time, field parameters (e.g., pH, conductivity, etc.), and other field observations relevant to sample integrity.

4.0 Field Audits and Corrective Action

Field Audits

A field audit will be conducted during the course of the RI once during each major field event. The ESC QAO will conduct the field audit. System and performance audits will monitor the adherence to the standard operating procedures for sample collection techniques and field documentation procedures. Additionally, the use of QA/QC samples, chain-of-custody procedures, and documentation on all QA/QC requirements will be monitored. All nonconforming items will be documented and addressed. A written report will be prepared and retained by the QAO. The report will address adherence to ESC's standard operating procedures for sample collection, preparation, preservation, storage, and field decontamination.

Field Corrective Action

Corrective measures will be identified, recommended, approved, and implemented to counter unacceptable procedures or out-of-quality performance, which can affect data quality. All corrective actions will be documented by field personnel and reported to the project manager.

Corrective action in the field may be needed when the sampling plan changes (e.g., more/less samples, sampling locations other than those proposed, etc.) or sampling procedures and/or field analytical procedures require modification due to unexpected conditions. The field team may identify the need for corrective action. The field team in conjunction with the project director or QAO will recommend corrective action. The project director will approve the corrective measure, which will be implemented by the field team. It will be the responsibility of the project director to ensure that corrective action has been implemented. The project director will be notified of any corrective action in additional or less samples need to collected and if project DQOs will not be met.

Corrective action resulting from internal field audits will be implemented immediately if data may be adversely affected due to unapproved or improper use of approved methods. The

ESC project director or QAO will identify deficiencies and recommend action that needs to be taken. The field team leader and field team will implement the corrective actions.

Field corrective actions will be implemented and documented in the field logbooks. Corrective actions will not be taken without prior discussion with the project director.

5.0 Data Validation

Data Review, Reduction, Validation and Verification Requirements

All samples analyzed will be subjected to data validation in accordance with the M2 and IM1 level of review found in the Region III Innovative Approaches to Data Validation Guidance (June 1995). ESC's QAO will validate the data using the original data from the laboratory. The laboratory will provide data in a format that allows for data validation appropriate to the DQOs for this RI (Level III).

The data validation process will involve a review of instrument calibration, instrument tuning and performance, holding times from time of sample collection, blanks, MS/MSD, interferences, compound identification, system performance (surrogates), verifying calculations, and data assessment. A preliminary review will be performed to verify that all necessary deliverables are present.

A detailed QA review will be performed by the ESC QAO to verify the qualitative and quantitative reliability of the data as they are presented. This review will include a detailed review and interpretation of all data generated by the laboratory. The primary tools for the data validation will be guidance documents, EPA Region III data validation guidelines, established method criteria, and best professional judgement.

Based on the review of data, a validation report will be prepared that will include qualifying statements that highlight any QC outliers and their effect on the usability of the data.

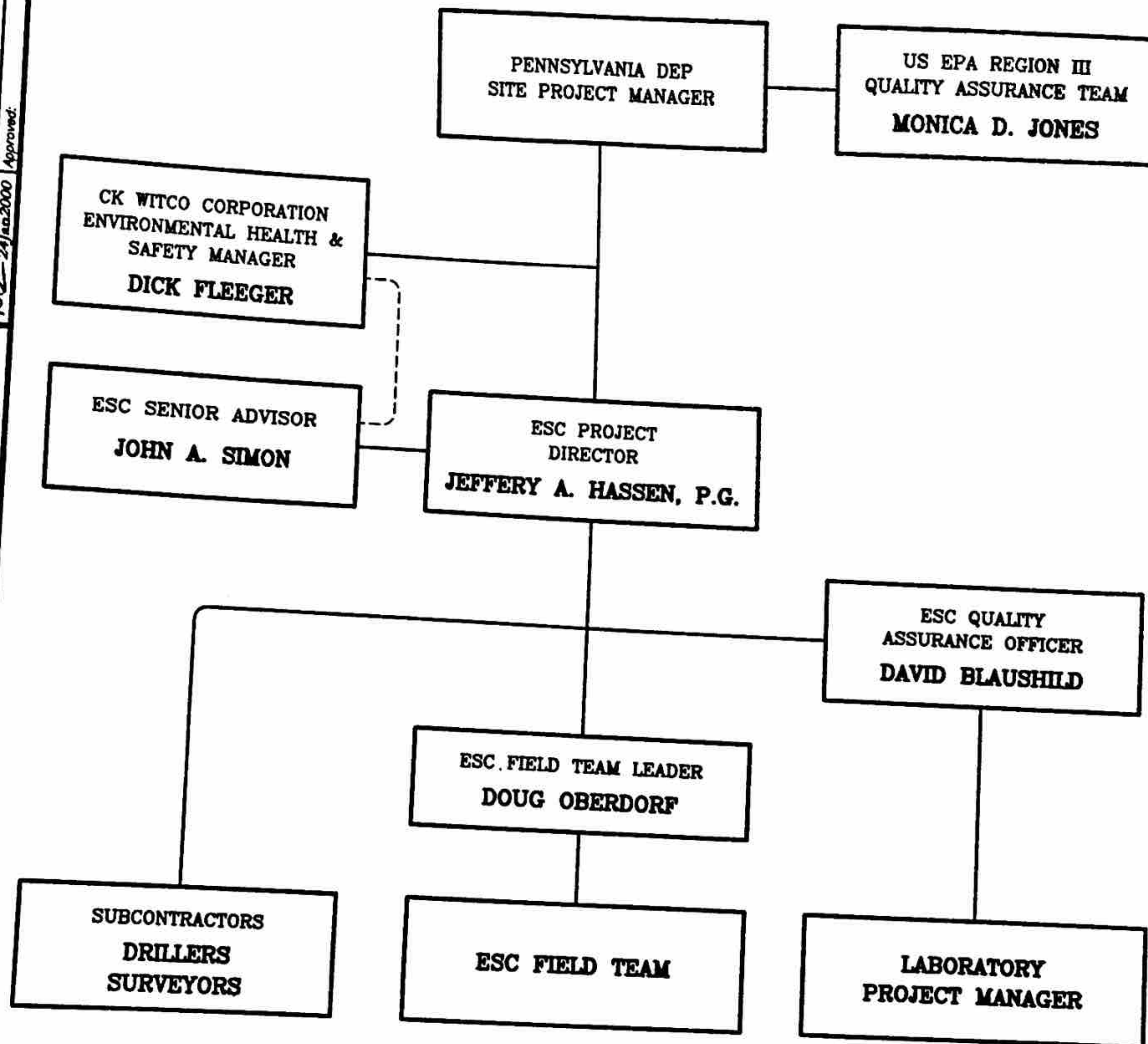


Table 1
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
<u>Volatile Organic Compounds</u>				
-1,1,1,2-Tetrachloroethane	56-133	20	56-133	20
1,1,1-Trichloroethane	70-130	22	70-130	24
1,1,2,2-Tetrachloroethane	70-130	20	70-130	20
-1,1,2-Trichloroethane	70-130	23	70-130	23
1,1-Dichloroethane	80-113	22	44-145	41
1,1-Dichloroethene	55-142	27	43-142	27
-1,1-Dichloropropene	NA	NA	NA	NA
1,2,3-Trichlorobenzene	NA	NA	NA	NA
1,2,3-Trichloropropane	NA	NA	NA	NA
-1,2,4-Trichlorobenzene	NA	NA	NA	NA
1,2,4-Trimethylbenzene	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	70-130	20	70-130	20
-1,2-Dibromomethane	NA	NA	NA	NA
1,2-Dichlorobenzene	70-130	20	70-130	20
1,2-Dichloropropane	70-130	20	70-130	20
1,3,5-Trimethylbenzene	NA	NA	NA	NA
1,3-Dichlorobenzene	70-130	20	70-130	20
1,3-Dichloropropane	NA	NA	NA	NA
1,4-Dichlorobenzene	70-130	20	70-130	20
2,2-Dichloropropane	NA	NA	NA	NA
2-Butanone (MEK)	NA	NA	NA	NA
2-Chlorotoluene	NA	NA	NA	NA
2-Hexanone	60-130	24	NA	NA
4-Chlorotoluene	NA	NA	NA	NA
Acetone	60-134	32	40-145	37
Benzene	79-116	20	60-140	20
Bromobenzene	NA	NA	55-138	20
Bromochloromethane	70-130	20	70-130	20
Bromoform	70-130	20	70-130	23
Bromomethane	70-130	20	70-130	20
Carbon disulfide	80-116	20	36-130	36
Carbon tetrachloride	72-133	25	36-130	36
Chlorobenzene	81-115	20	49-139	22
Chloroethane	70-130	24	70-130	24
Chloroform	61-122	25	20-110	36
Chloromethane	70-130	24	52-140	20
cis-1,2-Dichloroethene	70-130	20	70-130	20
cis-1,3-Dichloropropene	80-110	20	60-134	40
Dibromochloromethane	70-130	20	70-130	20
Dichlorofluoromethane	NA	NA	70-130	20
Ethylbenzene	70-130	25	70-130	25

Table 1 (continued)
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petroia, Pennsylvania

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Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
<u>Volatile Organic Compounds (continued)</u>				
Hexachlorobutadiene	NA	NA	NA	NA
Isopropylbenzene	NA	NA	NA	NA
Isopropyltoluene	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA
Naphthalene	75-125	20	75-125	20
n-Butylbenzene	NA	NA	NA	NA
n-Propylbenzene	NA	NA	NA	NA
sec-Butylbenzene	NA	NA	NA	NA
Styrene	70-130	22	70-130	22
tert-Butylbenzene	NA	NA	NA	NA
Tetrachloroethene	78-131	25	39-154	22
Toluene	76-119	20	46-147	24
trans-1,2-Dichloroethene	70-130	20	70-130	20
trans-1,3-Dichloropropene	80-114	32	49-132	31
Trichloroethene	80-122	20	46-143	23
Trichlorofluoromethane	75-125	20	75-125	20
Vinyl chloride	53-134	25	29-150	20
Xylenes (total)	37-162	20	37-162	20
<u>Semi-Volatile Organic Compounds</u>				
2,4,5-Trichlorophenol	31-110	37	29-125	29
2,4,6-Tribromophenol	21-122	NA	NA	NA
2,4,6-Trichlorophenol	41-125	37	21-126	60
2,4-Dichlorophenol	42-115	44	42-115	44
2,4-Dimethylphenol	32-119	20	32-119	20
2,4-Dinitrophenol	1-191	53	1-191	53
2,4-Dinitrotoluene	1-191	53	1-162	56
2,6-Dinitrotoluene	5-158	20	42-115	44
2-Chloronaphthalene	60-118	20	60-118	20
2-Chlorophenol	19-124	43	17-116	54
2-Methylnaphthalene	40-110	50	40-110	50
2-Methylphenol	33-115	31	33-113	39
2-Nitroaniline	11-138	63	11-138	63
2-Nitrophenol	29-182	32	10-148	64
3,3'-Dichlorobenzidine	1-162	56	1-162	56
3-Methylphenol & 4-Methylphenol	45-118	49	45-118	49
3-Nitroaniline	1-120	45	1-120	45
4,6-Dinitro-2-methylphenol	NA	NA	1-181	43
4-Bromophenyl phenyl ether	53-127	20	53-127	20
4-Chloro-3-methylphenol	29-124	55	17-128	55
4-Chloroaniline	1-112	40	NA	NA

Table 1 (continued)
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

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Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
<u>Semi-Volatile Organic Compounds (continued)</u>				
4-Nitroaniline	1-127	49	1-127	49
4-Nitrophenol	19-144	34	10-148	64
Acenaphthene	33-145	23	13-133	44
Acenaphthylene	33-145	23	33-145	22
Anthracene	33-145	23	27-133	22
Benzo(a)anthracene	33-143	23	33-143	23
Benzo(a)pyrene	17-162	31	17-163	31
Benzo(b)fluoranthene	24-159	28	24-159	28
Benzo(ghi)perylene	1-219	50	1-219	50
Benzo(k)fluoranthene	11-162	31	11-162	31
bis(2-Chloroethoxy)methane	33-184	30	33-143	23
bis(2-Chloroethyl) ether	12-158	30	12-158	30
bis(2-Ethylhexyl) phthalate	8-158	30	8-158	31
Butyl benzyl phthalate	1-152	35	1-152	35
Carbazole	1-175	20	1-175	20
Chrysene	17-168	31	17-168	31
Dibenz(a,h)anthracene	1-227	55	1-227	55
Dibenzofuran	46-117	42	46-117	42
Diethyl phthalate	1-114	24	1-114	24
Dimethyl phthalate	1-112	22	1-112	22
Di-n-butyl phthalate	1-118	24	1-118	24
Di-n-octyl phthalate	4-146	29	4-146	29
Fluoranthene	26-137	23	26-137	23
Fluorene	59-121	20	26-137	23
Hexachlorobenzene	57-128	22	39-127	29
Hexachlorobutadiene	36-116	32	31-110	41
Hexachlorocyclopentadiene	1-138	54	1-138	54
Hexachloroethane	30-110	33	39-127	29
Indeno(1,2,3-cd)pyrene	1-171	37	1-171	37
Isophorone	21-196	37	21-196	38
Naphthalene	21-133	23	21-133	23
Nitrobenzene	45-130	50	33-112	36
N-Nitrosodi-n-propylamine	30-115	36	12-128	50
N-Nitrosodiphenylamine	5-138	68	5-138	68
Pentachlorophenol	10-140	56	10-144	87
Phenanthrene	54-120	20	54-120	20
Phenol	10-131	43	10-148	50
Pyrene	46-130	31	10-218	27

Table 1 (continued)
Laboratory Precision and Accuracy for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

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Compound	Accuracy Water (Percent Recovery)	Precision Water (Percent RPD)	Accuracy Soil (Percent Recovery)	Precision Soil (Percent Recovery)
Metals				
Aluminum	75-125	20	75-125	35
Antimony	75-125	20	75-125	35
Arsenic	75-125	20	75-125	35
Barium	75-125	20	75-125	35
Beryllium	75-125	20	75-125	35
Cadmium	75-125	20	75-125	35
Chromium	75-125	20	75-125	35
Chromium VI	75-125	20	75-125	35
Cobalt	75-125	20	75-125	35
Copper	75-125	20	75-125	35
Iron	75-125	20	75-125	35
Lead	75-125	20	75-125	35
Manganese	75-125	20	75-125	35
Mercury	75-125	20	75-125	35
Nickel	75-125	20	75-125	35
Selenium	75-125	20	75-125	35
Silver	75-125	20	75-125	35
Thallium	75-125	20	75-125	35
Tin	75-125	20	75-125	35
Vanadium	75-125	20	75-125	35
Zinc	75-125	20	75-125	35

Table 2

Practical Quantitation Limits for Constituents of Interest
 CK Witco Corporation
 Petrolia, Pennsylvania

Compound	Practical Quantitation Limits					Soil Screening Criteria		
	Water (ug/l)	(a)	Low Soil (mg/kg)	(a)(b)(c)	Medium Soil (mg/kg)	(a)(b)(c)	PA	US EPA
							Act 2 Standards (d) (mg/kg)	Region III RBC (e) (mg/kg)
Volatile Organic Constituents								
Acetone	10		0.01		0.5		1,000	7,800
Carbon disulfide	5		0.005		0.25		410	7,800
2-Butanone (MEK)	10		0.01		0.5		580	47,000
2-Hexanone	10		0.01		0.5		NS	NS
Benzene	5		0.005		0.25		0.5	22
Bromobenzene	5		0.005		0.25		NS	NS
Bromochloromethane	5		0.005		0.25		NS	NS
Bromoform	5		0.005		0.25		NS	NS
Bromomethane	10		0.01		0.5		NS	81
n-Butylbenzene	5		0.005		0.25		1	110
sec-Butylbenzene	5		0.005		0.25		NS	780
tert-Butylbenzene	5		0.005		0.25		NS	780
Carbon tetrachloride	5		0.005		0.25		NS	780
Chlorobenzene	5		0.005		0.25		0.5	4.9
Chloroethane	10		0.01		0.25		100	1,600
Chloroform	5		0.005		0.5		5,800	220
Chloromethane	10		0.01		0.25		10	100
2-Chlorotoluene	5		0.005		0.5		0.3	49
4-Chlorotoluene	5		0.005		0.25		NS	1,600
Dibromochloromethane	5		0.005		0.25		NS	NS
1,2-Dibromo-3-chloropropane	5		0.005		0.25		10	7.6
1,2-Dibromomethane	5		0.005		0.25		0.02	46.0
1,2-Dichlorobenzene	5		0.005		0.25		20	NS
1,3-Dichlorobenzene	5		0.005		0.25		60	7,000
1,4-Dichlorobenzene	5		0.005		0.25		61	70
Dichlorofluoromethane	5		0.005		0.25		10	27
1,1-Dichloroethane	5		0.005		0.25		NS	NS
1,1-Dichloroethene	5		0.005		0.25		110	7,800
cis-1,2-Dichloroethene	5		0.005		0.25		0.7	1.1
trans-1,2-Dichloroethene	5		0.005		0.25		7	780
1,2-Dichloropropane	5		0.005		0.25		10	1,600
1,3-Dichloropropane	5		0.005		0.25		0.5	9.4
2,2-Dichloropropane	5		0.005		0.25		NS	NS
1,1-Dichloropropene	5		0.005		0.25		NS	NS
cis-1,3-Dichloropropene	5		0.005		0.25		NS	NS
trans-1,3-Dichloropropene	5		0.005		0.25		NS	3.5
Ethylbenzene	5		0.005		0.25		NS	3.5
					0.25		70	7,800

Table 2 (continued)

Practical Quantitation Limits for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

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Compound	Practical Quantitation Limits					Soil Screening Criteria		
	Water	(a)	Low Soil	(a)(b)(c)	Medium Soil	(a)(b)(c)	PA	US EPA
	(ug/l)		(mg/kg)		(mg/kg)		Act 2 Standards (d) (mg/kg)	Region III RBC (e) (mg/kg)
Volatile Organic Constituents								
Hexachlorobutadiene	5		0.005		0.25		1.2	8.2
Isopropylbenzene	5		0.005		0.25		NS	NS
Isopropyltoluene	5		0.005		0.25		NS	NS
Methylene chloride	5		0.005		0.25		0.5	85
Naphthalene	5		0.005		0.25		5	1,600
n-Propylbenzene	5		0.005		0.25		NS	NS
Styrene	5		0.005		0.25		NS	16,000
1,1,1,2-Tetrachloroethane	5		0.005		0.25		NS	25
1,1,2,2-Tetrachloroethane	5		0.005		0.25		0.32	3.2
Tetrachloroethene	5		0.005		0.25		0.5	12
Toluene	5		0.005		0.25		100	16,000
1,2,3-Trichlorobenzene	5		0.005		0.25		NS	NS
1,2,4-Trichlorobenzene	5		0.005		0.25		28	780
1,1,1-Trichloroethane	5		0.005		0.25		20	23,000
1,1,2-Trichloroethane	5		0.005		0.25		0.5	11
Trichloroethene	5		0.005		0.25		0.5	58
Trichlorofluoromethane	10		0.01		0.25		NS	23,000
1,2,3-Trichloropropane	5		0.005		0.5		4	0.091
1,2,4-Trimethylbenzene	5		0.005		0.25		NS	3,900
1,3,5-Trimethylbenzene	5		0.005		0.25		NS	3,900
Vinyl chloride	10		0.01		0.5		0.2	0.34
Xylenes (total)	5		0.005		0.25		1,000	160,000
Semi-Volatile Organic Compounds								
Phenol	10		0.33				400	47,000
bis(2-Chloroethyl) ether	10		0.33				0.055	0.58
2-Chlorophenol	10		0.33				4.4	390
2-Methylphenol	10		0.33				10	3,900
3-Methylphenol & 4-Methylphenol	10		0.33				10	390
N-Nitrosodi-n-propylamine	10		0.33				0.037	0.091
Hexachloroethane	10		0.33				0.56	46
Nitrobenzene	10		0.33				5.1	39
Isophorone	10		0.33				10	670
2-Nitrophenol	10		0.33				630	NS
2,4-Dimethylphenol	10		0.33				NS	1,600
bis(2-Chloroethoxy)methane	10		0.33				NS	NS
2,4-Dichlorophenol	10		0.33				5	230
Naphthalene	10		0.33				2	1,600
4-Chloroaniline	10		0.33				51	310
Hexachlorobutadiene	10		0.33				1.2	8.2
4-Chloro-3-methylphenol	10		0.33				100	NS

Table 2 (continued)

Practical Quantitation Limits for Constituents of Interest
 CK Witco Corporation
 Petrolia, Pennsylvania

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Compound	Water (ug/l)	(a)	Low Soil (mg/kg)	(a)(b)(c)	Act 2 Standards (d) (mg/kg)	Region III RBC (e) (mg/kg)
Semi-Volatile Organic Constituents						
2-Methylnaphthalene	10		0.33		10,000	1,600
Hexachlorocyclopentadiene	10		0.33		91	550
2,4,6-Trichlorophenol	25		0.8		67	58
2,4,5-Trichlorophenol	25		0.8		6,100	7,800
2,4,6-Tribromophenol	25		0.8		NS	NS
2-Chloronaphthalene	10		0.33		14,000	6,300
2-Nitroaniline	25		0.8		0.58	NS
Dimethyl phthalate	10		0.33		NS	NS
Acenaphthylene	10		0.33		4,400	NS
3-Nitroaniline	25		0.8		0.58	NS
Acenaphthene	10		0.33		4,300	4,700
2,4-Dinitrophenol	25		0.8		4.1	160
4-Nitrophenol	25		0.8		6	630
Dibenzofuran	10		0.33		NS	310
2,4-Dinitrotoluene	10		0.33		0.84	160
2,6-Dinitrotoluene	10		0.33		10	78
Diethyl phthalate	10		0.33		500	63,000
Fluorene	10		0.33		380	3,100
4-Nitroaniline	25		0.8		0.58	NS
4,6-Dinitro-2-methylphenol	25		0.8		NS	7.8
N-Nitrosodiphenylamine	10		0.33		82	130
4-Bromophenyl phenyl ether	10		0.33		NS	NS
Hexachlorobenzene	10		0.33		0.96	0.4
Anthracene	10		0.33		230	23,000
Pentachlorophenol	25		0.8		5	63
Carbazole	10		0.33		NS	32
Phenanthrene	10		0.33		11,000	NS
Di-n-butyl phthalate	10		0.33		4,100	7,800
Fluoranthene	10		0.33		3,300	3,100
Pyrene	10		0.33		220	2,300
3,3'-Dichlorobenzidine	10		0.33		33	1.4
Butyl benzyl phthalate	10		0.33		10,000	16,000
Chrysene	10		0.33		220	87
bis(2-Ethylhexyl) phthalate	10		0.33		130	46
Di-n-octyl phthalate	10		0.33		10,000	1,600
Benzo(b)fluoranthene	10		0.33		160	0.87
Benzo(k)fluoranthene	10		0.33		600	8.7
Benzo(a)pyrene	10		0.33		46	0.087
Indeno(1,2,3-cd)pyrene	10		0.33		28,000	0.87
Benzo(a)anthracene	10		0.33		320	7.8

Table 2 (continued)

Practical Quantitation Limits for Constituents of Interest
CK Witco Corporation
Petrolia, Pennsylvania

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Compound	Water (ug/l)	(a)	Soil (mg/kg)	(b)	PA Act 2 Standards (d) (mg/kg)	Region III RBC (e) (mg/kg)
Semi-Volatile Organic Constituents						
Dibenz(a,h)anthracene	10		0.33			
Benzo(ghi)perylene	10		0.33		160	0.087
					180	NS
Metals						
Aluminum	200		40			
Antimony	60		12		190,000	78,000
Arsenic	10		2		11,000	31
Barium	200		40		53	0.43
Beryllium	5		1		19,000	5,500
Cadmium	5		1		18	160
Chromium	10		2		1,400	39
Chromium VI	5		1		190,000	12,000
Cobalt	50		10		14,000	230
Copper	25		5		170,000	4,700
Iron	100		20		190,000	3,100
Lead	3		0.5		190,000	23,000
Manganese	15		3		1,000	NS
Mercury	0.2		0.04		130,000	1,600
Nickel	40		8		240	NS
Selenium	5000		1000		56,000	1,600
Silver	5		1		14,000	390
Thallium	5000		1000		14,000	390
Tin					220	5.5
Vanadium	50		10		190,000	47,000
Zinc	20		4		160	550
					190,000	23,000

a/ Detection limits are matrix dependent and may be higher.

b/ Detection limits for soils are reported on a dry-weight basis.

c/ Soils collected for VOCs in EnCore samplers:

Low concentration will be preserved with sodium bisulfite.

Medium concentration will be preserved with methanol.

d/ Pennsylvania Act 2 Medium Specific Concentrations for non-residential soils

e/ US EPA Region III Risk Based Concentrations for Residential Soils.

NS/ No standard available.

Table 3-1
Analytical Methods and Sample Handling Requirements (a)
Remedial Investigation
CK Witco Facility
Petrolia, Pennsylvania

Parameter	Matrix	Method (b)	Container	Preservative	Holding Time (c)
VOCs	Soil	5035/8260	3 EnCore [®] samplers; 1 125-ml glass (dry weight and effervescence test)	4°C	24 hours to preserve (d); 14 days from preservation to analysis.
SVOCs	Soil	3540/8270	1 250-ml glass	4°C	14 days to extraction; 40 days to analysis
Act 2 Metals	Soil	3020/6010/ 7471 <small>3020/6010</small>	1 250-ml glass	4°C	Mercury 28 days; All other metals 180 days
pH	Groundwater	Field Parameters	NA	NA	NA
Specific Conductance				NA	NA
Temperature				NA	NA
VOCs	Groundwater	5030/8260	2 40-ml VOA vials	4°C; HCl to pH<2	14 days
SVOCs	Groundwater	3520/8270	2 1000-ml amber glass	4°C	7 days to extraction; 40 days to analysis
Act 2 Metals (total)	Groundwater	3020/6010/ 7471	1 500-ml plastic 1 130-ml glass (mercury)	4°C; HNO3 to pH<2	Mercury 28 days; All other metals 180 days
Act 2 Metals (dissolved)	Groundwater	3020/6010/ 7471	1 500-ml plastic 1 130-ml glass (mercury)	4°C (e)	Mercury 28 days; All other metals 180 days

a/ VOCs - Volatile Organic Compounds.

SVOCs - Semi-Volatile Organic Compounds.

NA - not applicable.

b/ 3000 and 5000 series sample extraction or preparation methods; 6000, 7000 and 8000 series analytical methods.

c/ Holding times from time of sample collection.

d/ Samples collected in EnCore[®] samplers will be preserved with methanol within 24 hours of sample collection.

e/ Dissolved metals collected in an unpreserved container, filtered through
0.45 µ filter into a container preserved with HNO3 to pH<2.